Title (en)

Process for vapor phase epitaxy of compound semiconductor

Title (de)

Verfahren zum epitaktischen Wachsen einer Halbleiterverbindung in der Dampffase

Title (fr)

Procédé d'épitaxie en phase vapeur d'un composé semi-conducteur

Publication

EP 0801156 B1 20020904 (EN)

Application

EP 97302033 A 19970325

Priority

- JP 6776296 A 19960325
- JP 8757097 A 19970321

Abstract (en)

[origin: EP0801156A2] The present invention provides a process for forming a high quality epitaxial compound semiconductor layer of indium gallium nitride InxGa1-xN (where, 0<x<1) on a substrate (1). A first gas including indium trichloride (InCl3) and a second gas including ammonia (NH3) are introduced into a reaction chamber (56) heated at a first temperature and indium nitride (InN) is grown epitaxially on the substrate (1) by nitrogen (N2) carrier gas to form an InN buffer layer. Thereafter, a third gas including hydrogen chloride (HCl) and gallium (Ga) is introduced with the first and second gasses into the chamber (56) heated at a second temperature higher than the first temperature and an epitaxial InxGa1-xN layer is grown on the buffer layer by N2 gas. By using helium (He), instead of N2, as carrier gas, the InxGa1-xN layer with more homogeneous quality is obtained. In addition, the InN buffer layer is allowed to be modified into a GaN buffer layer.

IPC 1-7

C30B 25/02; C30B 29/40; H01L 21/205

IPC 8 full level

C30B 25/02 (2006.01); **C30B 29/38** (2006.01); **H01L 21/205** (2006.01); **H01L 33/00** (2006.01); **H01L 33/12** (2010.01); **H01L 33/32** (2010.01); **H01L 33/34** (2010.01); **H01S 5/00** (2006.01); **H01S 5/323** (2006.01)

CPC (source: EP KR US)

C30B 25/02 (2013.01 - EP US); **C30B 29/403** (2013.01 - EP US); **H01L 33/0075** (2013.01 - EP US); **H01S 3/2308** (2013.01 - KR); **H01S 5/0213** (2013.01 - KR); **H01S 5/2077** (2013.01 - KR)

Cited by

FR2904008A1; GB2338107A; EP1041610A4; CN1062917C; US6645885B2; US6861271B2; WO2008009805A1; US7357837B2; US7504323B2; US7521339B2

Designated contracting state (EPC)

DE FR GB

DOCDB simple family (publication)

EP 0801156 A2 19971015; **EP 0801156 A3 19980527**; **EP 0801156 B1 20020904**; CN 1097847 C 20030101; CN 1164759 A 19971112; DE 69715075 D1 20021010; DE 69715075 T2 20030123; JP 3879173 B2 20070207; JP H09315899 A 19971209; KR 100497262 B1 20050928; KR 970068061 A 19971013; US 5970314 A 19991019

DOCDB simple family (application)

EP 97302033 A 19970325; CN 97104545 A 19970325; DE 69715075 T 19970325; JP 8757097 A 19970321; KR 19970010253 A 19970325; US 82323797 A 19970324